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FINAL PHASE II
DATA ADDENDUM
SITE 36-2: MUNITIONS TEST AREA
AND INCENDIARY DROP SITE

September 1988
Contract Number DAAK11-84-D-0016
(Version 3.1)

Environmental Science And Engineering, Inc.
Harding Lawson Associates

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LITIGATION TECHNICAL SUPPORT AND SERVICES

Rocky Mountain Arsenal

**FINAL PHASE II
DATA ADDENDUM
SITE 36-2: MUNITIONS TEST AREA
AND INCENDIARY DROP SITE**

**September 1988
Contract Number DAAK11-84-D-0016
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PREPARED BY

**ENVIRONMENTAL SCIENCE AND ENGINEERING, INC.
Harding Lawson Associates**

PREPARED FOR

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR ROCKY MOUNTAIN ARSENAL

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SITE 36-2: MUNITIONS TEST AREA

1.0 PHASE II PROGRAM

As a result of the Phase I contamination assessment at Rocky Mountain Arsenal (RMA), a Phase II program was initiated at Site 36-2 in March, 1988. The Phase II program was conducted as presented in the Phase I Contamination Assessment Report (CAR), except that three borings were relocated (ESE, 1988, RIC#88063R04).

The sampling program at Site 36-2 consisted of 12 borings yielding 15 samples. Sampling locations were selected to investigate areas that were not fully characterized during the Phase I program. To investigate a Phase I dieldrin detection, three borings (Borings 3724, 3725, and 3726) were drilled in a triangular pattern around Phase I Boring 3277. The borings were placed 50 ft from Boring 3277, not 25 ft as planned in the Phase I CAR. Six samples were collected from the 0- to 1- and 2- to 3-ft intervals of these three borings using a drill rig and the continuous soil sampling method detailed in the Task 14 Technical Plan (ESE, 1987b, RIC#87343R02).

Six 0- to 1-ft samples were obtained using hand-augering methods from the five small burn pits and the open cut along the northeast site perimeter. Two hand-augered samples from the 0- to 1-ft interval were obtained adjacent to Buildings 725 and 726, and one sample was obtained from the 0- to 1-ft interval of the blast vent area northeast of Building 725. All samples were obtained at the predetermined intervals presented in the Phase I CAR.

Geophysical Anomalies D, E, and F were investigated by backhoe excavation. The anomalies were to be sampled only if trench debris was encountered, or if elevated photoionization detector (PID) readings were obtained.

Prior to any Phase II drilling, the Program Managers Office (PMO), Environmental Science and Engineering (ESE), Morrison-Knudsen Engineers (MKE), and Harding Lawson Associates (HLA) formulated procedures for MKE to obtain subsamples from selected soil cores during Phase II drilling. MKE did not request any subsamples from Site 36-2.

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The water table was not encountered in any Phase II borings or excavations at Site 36-2. Volcaniclastic bedrock was encountered at a depth of 7 ft in the excavation of geophysical Anomaly F.

The six samples obtained from Borings 3724, 3725, and 3726 were analyzed for organochlorine pesticides (OCP) by gas chromatography electron capture (GCEC). One sample from the 0- to 1-ft interval of Boring 3724 was also analyzed for semivolatile organic (SVO) compounds by gas chromatography/mass spectrometry (GC/MS) for confirmation of GCEC results. The nine 0- to 1-ft hand-augered samples from Borings 3715 to 3723 were analyzed for cadmium, chromium, copper, lead, and zinc by the Inductively Coupled Argon Plasma (ICP) method, for arsenic and mercury by atomic absorption (AA), and for SVO compounds by GC/MS. Three samples were analyzed by ion chromatography (IONCHROM) for the Army Agent Degradation Products (ADP), fluoracetic acid (FC2A), isopropylmethylphosphonic acid (IMPA), and methylphosphonic acid (MPA).

The Phase II samples, except those around Boring 3277, were analyzed for the Phase I suite, because Phase I borings were not located in the pits or near Buildings 725 and 726. The three 0- to 1-ft samples near Buildings 725 and 726 were also analyzed for ADPs by IONCHROM, because historical evidence indicated the possible presence of agents in Buildings 725 or 726. The samples from Borings 3724, 3725, and 3726 were analyzed for OCPs due to the detection of dieldrin in Boring 3277.

In the Phase I program, samples were analyzed for OCPs by GC/MS under the grouping of "semivolatile organic compounds". During the Phase II program, samples were analyzed for OCPs by GCEC and GC/MS methods. The GCEC method is considered quantitative, and the results are reported to two significant figures. In the GC/MS method, results are reported to only one significant figure. Due to these differences, results obtained from the GC/MS and GCEC methods may not be directly comparable. The analytical methods used for ICP metals, SVO compounds, arsenic, and mercury in the Phase I program were also used in the Phase II program. Samples were analyzed for IMPA only in the Phase II program, as the IONCHROM method was not available during the Phase I program. Appendix 36-2-II-A contains a complete list of analytes,

analytical methods, and standard abbreviations used in the Phase I and Phase II investigations.

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2.0 PHASE II FIELD OBSERVATIONS

The Phase II field observations at Site 36-2 are consistent with the field observations presented in the Phase I CAR (ESE, 1988, RIC#88063R04).

Anomalies D, E, and F were investigated by excavation as stated in the Site 36-2 Phase I CAR. The excavations in these anomalies encountered only natural soil with no PID readings above background; therefore, no samples were taken. Figure 36-2-II-1 in Section 4.0 shows the locations of all Phase I and Phase II borings and the anomalies investigated by trenching.

For safety purposes, air monitoring was conducted using a PID during drilling operations. Air monitoring at this site did not detect measurable levels of contaminants within the breathing zone or from soil samples.

An M18A2 test kit was used at this site to detect the presence of chemical agents in boreholes and soil samples. Specifically at RMA, the M18A2 test kit is used to Sarin (GB), VX, mustard (H), and Lewisite (L), based on the knowledge that these agents were manufactured, stored, or demilitarized at the site. The detection limit for H agents is 0.5 milligrams per cubic meter (mg/m^3), and the detection limit for GB, VX, and L is $0.2 \text{ mg}/\text{m}^3$. The detection limits for L and VX in soil are 5 parts per million (ppm) and 5.9 ppm, respectively. All M18A2 field test results for the detection of chemical agents at this site were negative.

Samples at Site 36-2 were tested for chemical agents by the RMA Laboratory because historical evidence indicated possible agent presence. A composite of intervals sampled was initially analyzed for GB, VX, H, and L. If agent had been detected, individual sample intervals from each boring would have been analyzed to identify stratigraphic location. No positive results of chemical agent testing were found at Site 36-2.

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3.0 PHASE II GEOPHYSICAL EXPLORATION

Prior to drilling, Borings 3724, 3725, and 3726 were cleared for safety purposes in accordance with the surface geophysical program detailed in the Task 14 Technical Plan (ESE, 1987b, RIC#87343R02). Borehole site clearance was used to ensure that drilling would not encounter buried unexploded ordnance (UXO) or other metal that could pose a significant safety risk. Magnetic intensity readings were obtained with a gradiometer. A 20-ft-square grid was centered on each boring location, and gradiometer readings were obtained at 5-ft intervals throughout the area. A contour map was prepared from the data and was used to place the boring in the safest location within the geophysical plot. Following borehole site clearance, a metal detector was used to check for surficial (0 to 2 ft) metal. The 12 hand-augered boring locations were cleared only by a metal detector survey for shallow (0 to 2 ft) buried metal. None of the Phase II boreholes were relocated as a result of the borehole site clearance conducted at Site 36-2.

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4.0 PHASE II ANALYTE LEVELS AND DISTRIBUTION

Table 36-2-II-1 contains indicator ranges and a statistical summary of Phase II analytical results. A summary of analytical data for each sample, including lithology and air monitoring results, is presented in Table 36-2-II-2. A tabulation of all analytical data associated with the Phase II investigation from this site is presented in Appendix 36-2-II-B.

To assess the significance of metal and organic analytical values, indicator ranges were established during the Phase I program. For organic compounds, the indicator level is the method detection limit. For metals, a range of values was selected to reflect the upper end of the expected natural range for each metal as normally found in RMA alluvial soil. The procedure for establishing indicator ranges is presented in the Introduction to the Contamination Assessment Reports (ESE, 1987a, RIC#88204R02). Concentrations within or above indicator ranges for Phase I and Phase II data are presented in Figure 36-2-II-1.

Cadmium was detected at a concentration of 2.9 ppm in Boring 3717, located in the blast vent area northeast of Building 725. Boring 3717 also contained fluoroacetic acid (FC2A) at 2.7 ppm. Boring 3715, which is located next to Building 726, contained dieldrin at a concentration of 0.4 ppm and zinc at a concentration of 260 ppm. Boring 3716, adjacent to Building 725, contained dieldrin (3 ppm), cadmium (1.6 ppm), copper (91 ppm), lead (160 ppm), and zinc (170 ppm).

The ICP metals cadmium, copper, and zinc were detected at concentrations within and above the indicator ranges in the six samples from the small pits and the open cut (Boring 3718 through 3723). Cadmium was detected in three of these samples at concentrations ranging from 1.4 to 3.3 ppm. Copper was detected in one sample at a concentration of 24 ppm. Zinc was detected in three samples in concentrations ranging from 61 to 66 ppm.

The three borings (Borings 3724 through 3726) surrounding Boring 3277 all contained dieldrin at concentrations ranging from 0.057 to 0.59 ppm in the 0- to 1-ft interval. Boring 3726, south of Phase I Boring 3277, also

Table 36-2-11-1. Summary of Analytical Results for Site 36-2 Phase II Soil Samples

Constituent	Number of Samples*	Concentrations (ug/g)				Indicator Level
		Range	Mean**	Median**	Standard Deviation**	
ORGANOCHLORINE PESTICIDES (N=6)+						
Hexachlorocyclopentadiene	0	--	--	--	--	DL
Aldrin	2	0.014-0.019	--	--	--	DL
Isodrin	2	0.002-0.006	--	--	--	DL
DDE, pp'	1	0.012	--	--	--	DL
Dieldrin	4	0.002-0.59	--	--	--	DL
Endrin	2	0.024-0.090	--	--	--	DL
DDT, pp'	1	0.014	--	--	--	DL
Chlordane	1	>0.21	--	--	--	DL
IMPA (N=3)+						
Fluoroacetic Acid	1	2.7	--	--	--	DL
SEMIVOLATILE ORGANICS (N=10)+						
Dieldrin	3	0.4-3	--	--	--	DL
ICP METALS (N=9)+						
Cadmium	5	1.4-3.3	2.3	3.3	0.83	DL-2.0
Chromium	7	10-15	12	15	2.2	25-40
Copper	9	8.9-91	22	17	26	20-35
Lead	1	160	--	--	--	25-40
Zinc	9	37-260	87	65	74	60-80
ARSENIC (N=9)+						
None Detected						DL-10
MERCURY (N=9)+						
	1	0.13	--	--	--	DL-0.10

* Number of samples in which constituent was detected. Only these sample results were used in statistical analyses.

** Statistics not calculated when constituent detected in fewer than five samples.

+ Number of samples analyzed by laboratory.

DL Detection limit.

Source: ESE, 1988.

Table 36-2-11-2. Concentrations of Target Analytes Above Detection Limits in Site 36-2 Phase 11 Soil Samples

Boring Number	3715	3716	3717	3718	3719	3720	3721	3722	3723	3724	3725	3725	3726
Depth (ft)	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	2-3	2-3
Geologic Material	Sandy Silt	Silty Sand	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt	Sandy Silt
AIR MONITORING													
PID*	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY													
Organochlorine Pesticides (OCP) (ug/g)													
Hexachlorocyclopentadiene	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
Aldrin	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
Isodrin	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
DDE, PP*	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
Dieldrin	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
Endrin	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
DDT, PP*	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
Chlordane	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	BDL	BDL	BDL	BDL
IMPA (ug/g)													
IMPA	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Fluoroacetic Acid	BDL	BDL	2.7	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ
MPA	BDL	BDL	BDL	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ	NRQ
Semivolatile Organics (SVO) by GC/MS (ug/g)													
Dieldrin	0.4	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NRQ	NRQ	NRQ	NRQ
ICP Metals (ug/g)													
Cadmium	BDL	1.6	2.9	3.3	BDL	1.4	2.5	BDL	BDL	NRQ	NRQ	NRQ	NRQ
Chromium	9.3	10	12	15	15	13	BDL	BDL	12	NRQ	NRQ	NRQ	NRQ
Copper	9.2	91	10	24	17	14	10	8.9	11	NRQ	NRQ	NRQ	NRQ
Lead	BDL	160	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NRQ	NRQ	NRQ	NRQ
Zinc	260	170	47	66	65	61	46	37	45	NRQ	NRQ	NRQ	NRQ
Arsenic (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NRQ	NRQ	NRQ	NRQ
Mercury (ug/g)	BDL	0.13	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NRQ	NRQ	NRQ	NRQ

< Higher detection limit due to dilution or soil matrix effects.

> Quantitative concentration was not achieved due to dilution constraints.

* As calibrated to an isobutylene standard.

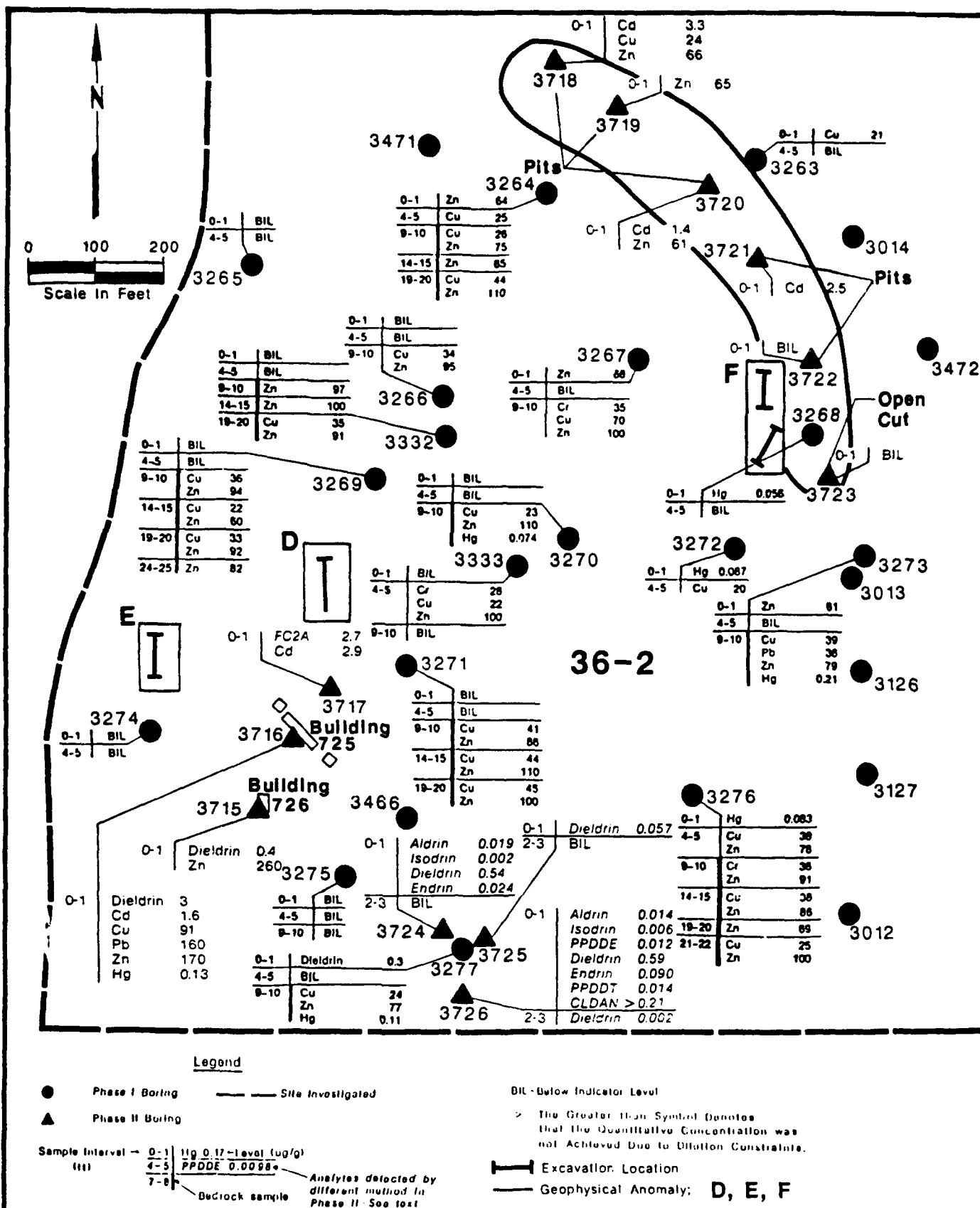
BDL Below detection limit.

BKD No reading above background.

NRQ Analysis not requested.

NA Not analyzed.

Source: ESE, 1988.



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contained dieldrin in the 2- to 3-ft interval at a concentration of 0.002 ppm. Aldrin, isodrin, and endrin were detected in the 0- to 1-ft interval of Borings 3724 and 3726, and Boring 3726 (0 to 1 ft) also contained dichlorodiphenylethane (DDE), dichlorodiphenyltrichloroethane (DDT), and chlordane.

The data reporting procedures as described in the Laboratory Quality Assurance Plan for RMA (ESE, 1985, Appendix B, RIC#85127R07) require that all analyses on a sample be completed within the sample's respective holding time and that analytical results be corrected for percent recovery and moisture content. During routine sample analysis, analytical results must also fall within the Certified Range. Samples must also be diluted within the Certified Range provided that holding times have not expired.

During laboratory certification, an analytical method is tested over a certain concentration range to determine the Certified Range. A typical tested concentration range would be 0, 0.5X, 1.0X, 2.0X, 5.0X, and 10.0X, where X is the Target Reporting Limit (TRL). The Certified Reporting Limit (CRL) is determined by comparing the target and actual concentrations of the tested range. The upper Certified Range is the highest target concentration achieved.

If a sample analysis indicates that the sample was not diluted adequately to be within the Certified Range, the result is reported as greater than (>) the upper Certified Range times any dilution factors. If a sample has exceeded its holding time and the result is greater than the Certified Range, the result is reported as greater than the upper Certified Range. If holding times are exceeded in attempting to dilute the sample until all results are within the Certified Range, results that are not identified above the Certified Range but that may be present at concentrations above the certified detection limit are reported as the detection limit times the dilution factor.

Several compounds detected by GC/MS were not included in the target compound list and were not conclusively identified. These compounds are included in

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the data presented in Appendix 36-2-II-B. Table 36-2-II-3 summarizes nontarget compounds detected at Site 36-2. It should be noted that an individual compound may have more than one retention time and that a particular retention time may be assigned to more than one compound. Table 36-2-II-3, therefore, provides only a general indication of additional compounds that may be present. Nontarget compounds consisting of alkanes and naturally occurring compounds were discovered in four samples from Site 36-2.

Results of the Phase II sampling program at Site 36-2 will be analyzed as part of the overall analysis for the Central Study Area Report.

Table 36-2-11-3. Tentative Identification of Nontarget Compounds in Site #2 Phase II Soil Samples

Boring Number	Interval Depth (ft)	Unknown Number	Concentration Above Background (ppm)*	Sample Number	Lot	Best Fit	Comments+
3718	0-1	609	0.8	36-2-21X7	KXA	Hexadecanoic acid Unknown alkane	d, f a
		650	1				
3719	0-1	609	1	36-2-21X9	KXA	Hexadecanoic acid Unknown alkane Unknown alkane	d a a
		650	1				
		651	1				
3720	0-1	650	2	36-2-21X11	KXA	Unknown alkane	a
3722	0-1	594	0.9	36-2-21X15	KXA	Unknown alkane Unknown alkane Unknown alkane Unknown alkane	a, f a a a
		595	1				
		600	1				
		601	1				
		606	1			Unknown alkane	a

* Values reported are method blank corrected.

+ a. No positive identification.

b. Surfactant.

c. Plasticizer (Note: All phthalates and adipates will have this comment).

d. Derived from natural products.

e. Suspected laboratory contaminant.

f. Low concentration.

g. Low frequency of occurrence.

h. Ubiquitous.

i. Possible column bleed.

j. None detected.

Source: ESE, 1988.

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APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

PHASE I ANALYTES AND CERTIFIED METHODS

Analytes/Methods	Synonymous Names ---and Abbreviations---	Standard Abbreviations
VOLATILE ORGANIC COMPOUNDS/GCMS	VOL	VO
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane (TCA)	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C ₆ H ₆
Bicycloheptadiene	Bicycloheptadiene (BCHD)	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL ₄
Chlorobenzene	Chlorobenzene	CLC ₆ H ₅
Chloroform	Chloroform	CHCL ₃
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMS
Ethylbenzene	Ethylbenzene	ETC ₆ H ₅
m-Xylene	meta-Xylene	13DMB
Methylene chloride	Methylene chloride	CH ₂ CL ₂
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o,p-Xylene	ortho- and/or para-Xylene	XYLEN
Tetrachloroethene (PCE)	Tetrachloroethylene	TCLEE
Toluene	Toluene	MEC ₆ H ₅
Trans 1,2-dichloroethene	Trans 1,2-dichloroethylene	12DCE
Trichloroethene (TCE)	Trichloroethylene	TRCLE
SEMIVOLATILE ORGANIC COMPOUNDS/GCMS	EXTRACTABLE ORGANIC COMPOUNDS (EX)	SVO
1,4-Oxathiane	1,4-Oxathiane	OXAT
2,2-Bis (para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-Bis (para-chlorophenyl) 1,1,1-trichloroethane	Dichlorodiphenyltrichloroethane	PPDDT
Aldrin	Aldrin	ALDRN
Atrazine	Atrazine	ATZ
Chlordane	Chlordane	CLDAN
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMSO ₂
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dieldrin	Dieldrin	DLDRN
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP

APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
SEMIVOLATILE ORGANIC COMPOUNDS (CONT)		
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP
Dithiane	Dithiane	DITH
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene (HCPD)	CL ₆ CP
Isodrin	Isodrin	ISODR
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1(2,4-dichlorophenyl) vinyl diethyl phosphate	SUPONA
Vapona	Vapona	DDVP
METALS/ICP		
Cadmium	ICAP Cadmium	ICP CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
SEPARATE ANALYSES		
Arsenic/AA	Arsenic	AS
Mercury/AA	Mercury	HG
Dibromochloropropane/GC	Dibromochloropropane	DBCP

07/06/87

**APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS**

PHASE II ANALYTES AND CERTIFIED METHODS

Analytes/Methods	Synonymous Names ---and Abbreviations---	Standard Abbreviations
VOLATILE ORGANIC COMPOUNDS/GCMS (Same as Phase I)	VOL	VO
SEMIVOLATILE ORGANIC COMPOUNDS/GCMS (Same as Phase I)	EXTRACTABLE ORGANIC COMPOUNDS (EX)	SVO
VOLATILE HALOCARBON COMPOUNDS/GCCON	PURGEABLE HALOCARBONS (PHC)	VHO
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1-Dichloroethene	1,1-Dichloroethene	11DCE
1,1,1-Trichloroethane (TCA)	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Carbon tetrachloride	Carbon tetrachloride	CCl ₄
Chlorobenzene	Chlorobenzene	ClC ₆ H ₅
Chloroform	Chloroform	CHCl ₃
Methylene chloride	Methylene chloride	CH ₂ Cl ₂
Trans 1,2-dichloroethylene	Trans 1,2-dichloroethene	12DCE
Tetrachloroethene (PCE)	Tetrachloroethylene	TCLEE
Trichloroethene (TCE)	Trichloroethylene	TRCLE
VOLATILE HYDROCARBON COMPOUNDS/GCFID	DCPD	HYDCBN
Bicycloheptadiene	Bicycloheptadiene (BCHD)	BCHPD
Dicyclopentadiene	Dicyclopentadiene	DCPD
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
VOLATILE AROMATIC COMPOUNDS/GCPID	PURGEABLE AROMATICS (PAM)	VAO
Benzene	Benzene	C ₆ H ₆
Ethylbenzene	Ethylbenzene	ETC ₆ H ₅
m-Xylene	meta-Xylene	13DMB
o,p-Xylene	ortho- and/or para-Xylene	XYLEN
Toluene	Toluene	MEC ₆ H ₅
ORGANOCHLORINE PESTICIDES/GCEC		OCF
2,2-Bis (para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	PPDDE
2,2-Bis (para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloroethane	PPDDT
Aldrin	Aldrin	ALDRN
Chlordane	Chlordane	CLDAN
Dieldrin	Dieldrin	DLDRN
Endrin	Endrin	ENDRN
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	CL ₆ CP
Isodrin	Isodrin	ISODR

APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS

Analytes/Methods	Synonymous Names and Abbreviations	Standard Abbreviations
ORGANOPHOSPHOROUS PESTICIDES/GCNPd	ORGANOPHOSPHOROUS COMPOUNDS (OPC)	OPP
Atrazine	Atrazine	ATZ
Malathion	Malathion	MLTHN
Parathion	Parathion	PRTHN
Supona	2-Chloro-1(2,4-dichlorophenyl) vinyl diethyl phosphate	SUPONA
Vapona	Vapona	DDVP
ORGANOPHOSPHOROUS COMPOUNDS/GCFFPD	DIMP	OPC
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DIMP
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DMMP
ORGANOSULPHUR COMPOUNDS/GCFFPD		OSC
1,4-Oxathiane	1,4-Oxathiane	OXAT
Benzothiazole	Benzothiazole	BTZ
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CPMS
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMSO ₂
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO
Dimethyldisulfide	Dimethyldisulfide	DMDS
Dithiane	Dithiane	DITH
METALS/ICP	ICAP	ICP
Cadmium	Cadmium	CD
Chromium	Chromium	CR
Copper	Copper	CU
Lead	Lead	PB
Zinc	Zinc	ZN
SEPARATE ANALYSES		
Arsenic/AA	Arsenic	AS
Mercury/AA	Mercury	HG
Dibromochloropropane/GC	Dibromochloropropane	DBCP

07/06/87

**APPENDIX 36-2-II-A
CHEMICAL NAMES, METHODS, AND ABBREVIATIONS**

Analytes/Methods	Synonymous Names ---and Abbreviations---	Standard Abbreviations
ARMY AGENT DEGRADATION PRODUCTS:		ADP
AGENT PRODUCTS/HPLC	TDGCL	
Chloroacetic Acid	Chloroacetic acid	CLC2A
Thiodiglycol	Thiodiglycol (TDG)	TDGCL
AGENT PRODUCTS/IONCHROM	IMPA	GBDP
Fluoroacetic acid	Fluoroacetic acid	FC2A
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	IMPA
Methylphosphonic acid	Methylphosphonate	MPA

Methods**Abbreviations**

Atomic Absorption Spectroscopy	AA
Gas Chromatography/Conductivity Detector	GCCON
Gas Chromatography/Electron Capture	GCEC
Gas Chromatography/Flame Ionization Detector	GCFID
Gas Chromatography/Flame Photometric	GCFPD
Gas Chromatography/Mass Spectrometry	GCMS
Gas Chromatography/Nitrogen Phosphorous Detector	GCNPD
Gas Chromatography/Photoionization Detector	GCPID
High Performance Liquid Chromatography	HPLC
Inductively Coupled Argon Plasma	ICP, ICAP
Ion Chromatography	IONCHROM

APPENDIX 36-2-II-B
PHASE II CHEMICAL DATA

ENVIRONMENTAL SCIENCE & ENGINEERING 06/22/88
 PROJECT NUMBER 87427 0000 PROJECT NAME RMA TASK 21
 FIELD GROUP 36-2-21 PROJECT MANAGER
 ALL LAB COORDINATOR JOE VONDRICA

PARAMETERS	UNITS	STORET #	3715A	3716A	3717A	3718A	3719A	3720A	3721A	3722A	3723A	3724A	3724B	3725A	3725B	3726A	3726B
		METHOD	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21	36-2-21
			1	3	5	7	9	11	13	15	17	19	20	22	23	25	26
DATE			03/02/88	03/02/88	03/02/88	03/02/88	03/02/88	03/02/88	03/02/88	03/02/88	03/02/88	03/09/88	03/09/88	03/09/88	03/09/88	03/09/88	03/09/88
TIME			13:09	13:13	13:18	13:32	13:36	13:43	13:51	13:58	14:06	11:21	11:25	10:58	11:02	10:32	10:35
DIMP	UG/G-DRY	98645	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
1,4 DITHIANE	UG/G-DRY	98650	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
DMMP	UG/G-DRY	98657	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5
ENDRIN	UG/G-DRY	98369	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70	<0.70
HEXACHLOROCYCLOPENT-ADIENE	UG/G-DRY	98647	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1	<1.1
ISODRIN	UG/G-DRY	98649	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33	<0.33
MALATHION	UG/G-DRY	98648	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59
1,4 OXATHIANE	UG/G-DRY	98644	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26	<0.26
ETY'PARATHION	UG/G-DRY	98658	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63	<0.63
SUPONA	UG/G-DRY	98656	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49	<0.49
VAPONA	UG/G-DRY	98646	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
MPA	UG/G	97382	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10	<2.10
FLUOROACETIC ACID	UG/G	97381	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
HEXACHLOROCYCLOPENT-ADIENE	UG/G-DRY	98647	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ALDRIN	UG/G-DRY	98356	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ISODRIN	UG/G-DRY	98649	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DDE, PP'	UG/G-DRY	98363	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DIELDRIN	UG/G-DRY	98365	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
ENDRIN	UG/G-DRY	98369	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
DDT, PP'	UG/G-DRY	98364	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
CHLORDANE	UG/G-DRY	98361	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UNK594	UG/G	90594	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
UNK595	UG/G	90595	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

0.9

1

1

SAMPLE ID/#

PARAMETERS STORET # METHOD BLK T47MB1 BLK T47MB1 BLK T47MB1 BLK T47MB1 BLK T47MB1 BLK T47MB1
 UNITS 4 24 46 83 85 107 123

DATE TIME 02/29/88 02/29/88 02/29/88 03/01/88 03/09/88 03/09/88 02/24/88

SAMPLE TYPE	71999	SO	SO	SO	SO	SO	SO	SQ
SITE TYPE 1	99759	OCMB	OCMB	OCMB	OCMB	OCMB	OCMB	OCMB
SAMPLE DEPTH FT	99758	0	0	0	0	0	0	0
SAMPLING TECHNIQUE	72005	G	G	G	G	G	G	G
INSTALLATION CODE	99720	RK	RK	RK	RK	RK	RK	RK
MOISTURE	70320	2.4	2.4	2.4	2.4	2.4	2.4	2.4
NET WT	1028	<0.921						
CADMIUM	UG/G- DRY	R9						
CHROMIUM	99584	10.2						
COPPER	1043	8.64						
LEAD	1052	<16.8						
ZINC	1093	34.9						
ARSENIC	1003	<4.70						
MERCURY	71921	<0.050						
ALDRIN	98356		<0.94	<0.94				
ATRAZINE	98655		<0.73	<0.73				
CHLORDANE	98361		<1.5	<1.5				
P-CLPHENYLMETHY-	98653		<0.25	<0.25				
SULFIDE	98654		<0.35	<0.35				
P-CLPHENYLMETHY-	98703		<0.29	<0.29				
SULFOXIDE	98652		<0.33	<0.33				
P-CLPHENYLMETHY-	98651		<0.26	<0.26				
SULFONE	98363		<0.29	<0.29				
DBCP (NEMAGON)	98364		<0.37	<0.37				
DICYCLOPENTADIENE	98365		<0.25	<0.25				
DDE, PP'								
DDT, PP'								
DIELDRIN								

ENVIRONMENTAL SCIENCE & ENGINEERING 06/23/88
 PROJECT NUMBER 88425 0000 PROJECT NAME RMA TASK 47
 FIELD GROUP T47MB1 PROJECT MANAGER
 ALL LAB COORDINATOR JOE VONDRICK

SAMPLE ID/

BLK BLK
 T47MB1 T47MB1 T47MB1
 4 24 46 83 85 107 123

PARAMETERS STORET #
 UNITS METHOD

DATE TIME 02/29/88 02/29/88 02/29/88 03/01/88 03/09/88 03/09/88 02/24/88

DIMP	98645	Q9	UC/G-DRY	0.50	0.50	0.50	0.50
1,4 DITHIANE	98650	Q9	UC/G-DRY	0.25	0.25	0.25	0.25
DHMP	98657	Q9	UC/G-DRY	1.5	1.5	1.5	1.5
ENDRIN	98369	Q9	UC/G-DRY	0.70	0.70	0.70	0.70
HEXACHLOROCYCLOPENT-	98647	Q9	UC/G-DRY	1.1	1.1	1.1	1.1
ADIENE	98649	Q9	UC/G-DRY	0.33	0.33	0.33	0.33
ISODRIN	98649	Q9	UC/G-DRY	0.59	0.59	0.59	0.59
MALATHION	98648	Q9	UC/G-DRY	0.26	0.26	0.26	0.26
1,4 OXATHIANE	98644	Q9	UC/G-DRY	0.63	0.63	0.63	0.63
ETYPARATHION	98658	Q9	UC/G-DRY	0.49	0.49	0.49	0.49
SUPONA	98656	Q9	UC/G-DRY	0.25	0.25	0.25	0.25
VAPONA	98646	Q9	UC/G-DRY	0.003	0.003	0.003	0.003
HEXACHLOROCYCLOPENT-	98647	Q9	UC/G-DRY	0.002	0.002	0.002	0.002
ADIENE	SS9A	SS9A	UC/G-DRY	0.001	0.001	0.001	0.001
ALDRIN	98356	SS9A	UC/G-DRY	0.001	0.001	0.001	0.001
ISODRIN	98649	SS9A	UC/G-DRY	0.001	0.001	0.001	0.001
DDE, PP'	98363	SS9A	UC/G-DRY	0.001	0.001	0.001	0.001
DIELDRIN	98365	SS9A	UC/G-DRY	0.001	0.001	0.001	0.001
ENDRIN	98369	SS9A	UC/G-DRY	0.002	0.002	0.002	0.002
DDT, PP'	98364	SS9A	UC/G-DRY	0.111	0.111	0.111	0.111
CHLORDANE	98361	SS9A	UC/G-DRY	2.10	2.10	2.10	2.10
IMPA	97382	AAA9	UC/G	4.74	4.74	4.74	4.74
FLUOROACETIC ACID	97381	AAA9	UC/G	2.00	2.00	2.00	2.00
HPA	97383	AAA9	UC/G				
UNKS24	90524	Q9	UC/G				